What Drives Participation In State Voluntary Cleanup Programs? Evidence From Oregon

Allen Blackman, Resources for the Future
Thomas Lyon, University of Michigan
Kris Wernstedt, Virginia Tech.
Sarah Darley, Resources for the Future

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Outline

- Introduction
- Literature
- Oregon’s cleanup programs
- Analytical framework
- Data and variables
- Econometric model
- Results
- Conclusion

Introduction

- 1980: Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- Today: over 100,000 contaminated sites still not remediated
  - Liability concerns
  - Limited regulatory resources
- Nearly all states have established voluntary cleanup program (VCPs) to provide incentives for remediation
  - Liability relief
  - Variable cleanup standards
  - Regulatory flexibility
  - Financial incentives
- Today: over 20,000 sites participating in VCPs

What drives participation in VCPs?

- Very little rigorous research
- Lack of data on non-participating sites needed to construct a control group
  - Such sites often “mothballed”
- Alberini (2007)
  - Focuses on Colorado’s VCP
  - Uses CERCLIS to construct a control group
  - Finds VCP mainly attracts sites not listed in CERCLIS with little contamination and high development potential

Alberini (2007)

"... these findings cast doubt on whether the [Colorado] VCP is truly attaining its original cleanup and environmental remediation goals and hints at the possibility that participation might be driven exclusively by the desire to rid the parcel of any stigma associated with the current or previous use of land (or to prevent such an effect with future buyers)."

Our study

- Oregon
  - Has a robust VCP
  - Maintains a registry of known contaminated sites (ECSI) including those NOT participating in VCP
- Main findings
  - VCP does attract sites with significant contamination
  - A key driver of participation is publicly “listing” sites with significant confirmed contamination
  - Hence, Oregon has been able to spur voluntary remediation through public disclosure

Literature: drivers of participation in voluntary environmental public programs

- Regulatory pressure
  - Theory (Segerson & Miceli 1998, Maxwell, Lyon & Hackett 2000)
  - Evidence: firms named as superfund responsible parties and firms out of compliance with RCRA and CAA more likely to join EPA's 33/50 program (Khanna & Damon 1999, Videras & Alberini 2000, Sam & Innes 2006, Vidovic & Khanna 2007)
  - Evidence: firms that join voluntary programs receive preferential treatment from regulators (Cothran 1993, Decker 2003)

Literature: drivers of participation in voluntary public programs (cont'd)

- Market pressure
  - Theory (Arora & Gangopadhayay 1995)
  - Evidence: firms with higher advertising/sales ratios and more direct contact with consumers more likely to participate in the 33/50, WasteWi$e & Green Lights programs (Arora & Cason 1996, Vidovic & Khanna 2007, Videras & Alberini 2000)
- Community and NGO pressure
  - Informal regulation (World Bank 2000)
- Transactions costs
  - Project XL (Blackman & Mazurek 2001)

Literature: drivers of participation in VCPs

- Econometric analysis of participation: (Alberini 2007)
- Analyses of drivers of remediation (Alberini et al. 2005, Wernstedt, Meyer & Alberini 2006, Sherman 2003, Lange & McNeil 2004, Schoenbaum 2002))
  - Liability relief
  - Subsidies
  - Regulatory relief
  - Level of contamination

Literature: public disclosure

- Does it improve environmental performance?
  - Toxic Release Inventory (Bui 2005, Greenstone 2003, Koehler & Spengler 2007)
  - National valuation and ratings programs (García et al. 2007, Powers et al. 2008)
  - 1996 SDA amendments requiring community drinking water systems to publicly report violations (Bennear & Olmstead 2007)
  - Public reporting by electric utilities on fossil fuels use (Delmas, Montes-Sancho & Shimshack 2007)
  - Public reporting of noncompliance in pulp and paper sector in British Colombia (Foulon, Lanoie & Laplante 2002)

Oregon Department of Environmental Quality (DEQ) Cleanup Programs

- Environmental Cleanup Site Information (ECSI) data base
  - Known contaminated, potentially contaminated, formerly contaminated sites
  - July 2006: 4,223 sites
- Confirmed Release List (CRL), a subset of ECSI
  - Sites where contamination is
    - Confirmed
    - Significant in quantity or hazard
    - Not yet cleaned up
  - Formal listing/delisting process w/ public comment period
  - Listing subjects site manager to enhanced pressure from regulators and other stakeholders (e.g., lenders)

Oregon DEQ Cleanup Programs (cont'd)

- Mandatory Site Response Program (10% of ECSI sites)
  - Mainly "high priority" sites
  - DEQ provides oversight and dictates remedial action
- Voluntary Cleanup Program (VCP) (27% ECSI sites)
  - Medium- and low-priority sites
  - Site manager & DEQ jointly develop a cleanup plan
  - Public comment periods
  - Upon successful completion of cleanup plan and public comment, DEQ issues No Further Action (NFA) or Conditional NFA letter
  - Site manager must pay for DEQ time
  - Benefits (according to DEQ)
    - Possible regulatory exemptions from permits
    - Ability to redevelop part of site before cleanup complete
  - Risks (according to DEQ)
    - Sites added to ECSI
    - May be forced into Site Response Program

Oregon DEQ Cleanup Programs (cont'd)

- Independent Cleanup Pathway (ICP) (7% ECSI sites)
  - High-priority sites excluded
  - Less oversight than VCP
  - Site managers may independently conduct cleanup and then request approval from DEQ
  - No waivers of DEQ permits
- DEQ invites ECSI sites to join VCP and ICP via "option letters"
  - 87% of VCP/ICP participants were ECSI sites that received an option letter
  - 13% were not in ECSI when joined

Analytical Framework

- Managers join VCP/ICP if expected benefits > costs
  - Expected benefits of joining
    - Avoided future liability costs from NFA
    - Appreciation in property value from NFA
    - Avoided costs imposed by community/NGOs
    - Avoided additional (transactions and cleanup) costs of mandatory SRP
  - Expected costs of joining
    - Transactions costs (pecuniary & nonpecuniary)
    - Cleanup costs
    - For non-ECSI sites, costs associated with informing DEQ about contamination
- These expected benefits & costs vary across sites
- We don’t observe benefits & costs directly, but do observe proxies

Regression samples

- Beginning with 4,223 ECSI sites, drop sites…
  - Missing geographic locator or prior use information
  - Data internally inconsistent
  - Ineligible to join because in mandatory program, high priority, or on NPL
  - That received “ultimatum letter”
  - High priority sites (for ICP sample only)
- VCP sample
  - 1680 sites of which 36% joined VCP
- ICP sample
  - 1642 sites of which 9% joined ICP

Variables in Econometric Analysis

Variable	Description	VCP Sample		
		All n=1,680	**Parts. n=613**	**Nonparts. n=1,067**
DEPENDENT				
VCP	Participant in Voluntary Cleanup Program?*	0.365	1	0
ICP	Participant in Independent Cleanup Pathway?*	0.107	0.109	0.105
INDEPENDENT				
Regulatory activity				
CRL	On Confirmed Release List?*	0.255	0.423	0.159
CERCLIS	In CERCLIS?*	0.168	0.119	0.197
PERMIT	Has DEQ permit?*	0.168	0.194	0.150
E_REGION	In DEQ eastern region?*	0.263	0.321	0.229
W_REGION	In DEQ western region?*	0.371	0.238	0.448
NW_REGION	In DEQ northwestern region?*	0.366	0.440	0.323
Neighborhood characteristics				
HOUSEVAL	Median house value in census block group ($)	142,237.1	145,068.4	140,610.5
TR_TIME	Med. travel time to work in census block group (min.)	12890.9	13,120.9	12,758.8
Prior use				
14 dummies	Two-digit SIC code categories			

Duration model

$$h(t, \mathbf{X_t}, \beta) = f(t, \mathbf{X_t}, \beta)/(1 - F(t, \mathbf{X_t}, \beta))$$

where
f = density gives pr(event at time t)
F = cumulative density

$$h(t) = h_0(t)\exp(\mathbf{X_t}'\beta)$$

where
$h_0(t)$ = baseline hazard rate

Advantages of duration model

- Controls for potential endogeneity of *CRL* and *PERMIT*
- Controls for right censoring: sites may join VCP/ICP after our panel ends

Regression Results
(hazard ratios and S.E.s)

Variable	Model 1 Dep. var. = VCP	Model 2 Dep. var. = ICP
Regulatory activity		
CRL	1.280** (0.125)	0.743 (0.167)
CERCLIS	1.024 (0.149)	1.455 (0.425)
PERMIT	1.303** (0.139)	0.956 (0.259)
W_REGION	1.122 (0.131)	3.240*** (0.815)
NW_REGION	1.342** (0.165)	2.577*** (0.737)
Neighborhood characteristics		
HOUSEVAL	1.000 (0.00000069)	1.000 (0.0000011)
TR_TIME	1.000* (0.000004)	1.000 (0.0000083)
Prior use		
14 dummies	14 significant	4 significant

*** significant at 1% level
** significant at 5% level
* Significant at 10% level

Conclusions

- Both VCP and ICP are attracting sites with significant contamination
  - VCP: 41% of 613 participating sites “listed” in CRL
  - ICP: 25% of 155 participating sites “listed” in CRL
- Listing increases probability of joining VCP by 28%
  - By Increasing regulatory & non-regulatory pressure and therefore raising expected benefit of joining?
- Together, these 2 findings imply DEQ is able to spur voluntary remediation via public disclosure (CRL)
  - A mechanism for encouraging voluntary remediation that has received little attention
  - Presumably relatively inexpensive
  - Comports with literature on public disclosure

Thank you